



May 13, 2008

Mr. Charles Terreni  
Chief Clerk/Administrator  
Public Service Commission of South Carolina  
P. O. Drawer 11649  
Columbia, South Carolina 29211

Re: Docket No. 2008-1-E

Dear Mr. Terreni:

Enclosed for filing in the subject docket is the revised direct testimony of Progress Energy Carolinas, Inc. witness Dewey S. Roberts, II. This testimony was revised to reflect the test period of April 1, 2007 to February 29, 2008 in order to align the operating information with the accounting information. All parties of record have been served.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Len S. Anthony', written over a large, stylized, triangular-shaped flourish.

Len S. Anthony  
General Counsel – Progress Energy Carolinas

LSA:daf

Enclosures

cc: All parties of record

263093

**STATE OF SOUTH CAROLINA  
BEFORE THE PUBLIC SERVICE COMMISSION**

**DOCKET NO. 2008-1-E**

In the Matter of:

Carolina Power & Light Company, d/b/a     )  
Progress Energy Carolinas, Inc., - Annual     )  
Review of Base Rates for Fuel Costs     )

**CERTIFICATE OF SERVICE**

I, Len S. Anthony, hereby certify that the revised testimony of Progress Energy Carolinas, Inc. witness Dewey S. Roberts, II has been served on all parties of record electronically, by hand delivery or by depositing said copy in the United States mail, postage prepaid, addressed as follows this the 13th day of May, 2008:

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**PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA  
DOCKET NO. 2008-1-E  
REVISED DIRECT TESTIMONY OF  
PROGRESS ENERGY CAROLINAS, INC.**

**WITNESS DEWEY S. ROBERTS II**

1   **Q.   Mr. Roberts will you please state your full name, occupation, and address?**

2   **A.**My name is Dewey S. Roberts II (Sammy). I am employed by Progress Energy  
3           Carolinas, Inc. (PEC) as Manager – Power System Operations in the System  
4           Planning and Operations Department. My business address is 3401 Hillsborough  
5           St, Raleigh, North Carolina.

6   **Q.   Please summarize briefly your educational background and experience.**

7   **A.**I graduated from North Carolina State University in 1987 with a B.S. Degree in  
8           Electrical Engineering. I also obtained a Master of Science Degree in Electrical  
9           Engineering from North Carolina State University in 1990 and a Master of Business  
10          Administration Degree from North Carolina State University in 2004. I am a  
11          member of the Institute of Electrical and Electronics Engineers (IEEE). I am also a  
12          registered Professional Engineer in the state of North Carolina and I am recognized  
13          as a Certified System Operator by the North American Electric Reliability Council.  
14          I joined the Company in 1990 and have held several engineering and management  
15          positions in Nuclear Engineering, Engineering and Technical Services, System  
16          Operator Training, Portfolio Management, Transmission Services, and Power  
17          System Operations. These positions include: Project Engineer, Manager -  
18          Transmission Services, and Manager-Power System Operations. In November  
19          2003, I assumed the position of Manager – Power System Operations in the Power

1 System Operations Section of Progress Energy Carolinas, Inc. System Planning and  
2 Operations Department. In my current position as Manager-Power System  
3 Operations, I am responsible for managing the safe, reliable, economic, and  
4 NERC/FERC and environmentally compliant operations for the Progress Energy  
5 Carolinas' eastern and western control area power systems.

6 **Q. What is the purpose of your testimony here today?**

7 **A.** The purpose of my testimony is to review the operating performance of the  
8 Company's nuclear, fossil, combined cycle, combustion turbine, and hydroelectric  
9 generating facilities during the period of April 1, 2007 through February 29, 2008  
10 and demonstrate that PEC prudently operated its system for the period under  
11 review.

12 **Q. Describe the types of generating facilities owned and operated by the**  
13 **Company.**

14 **A.** The Company owns and operates a diverse mix of generating facilities consisting of  
15 four (4) hydro plants, forty seven (46) combustion turbines, three (3) combined  
16 cycle units, nineteen (19) fossil steam generating units, and four (4) nuclear units.

17 **Q. Why does the Company utilize such a diverse mix of generating facilities?**

18 **A.** Each type of facility has different operating and installation costs and is generally  
19 intended to meet a certain type of loading situation. In combination, the diversity of  
20 the system, in conjunction with power purchases made when doing so is more cost-  
21 effective than using a Company owned generating unit, allows the Company to  
22 meet the continuously changing customer load pattern in a reasonable, cost-  
23 effective manner. The combustion turbines, which have relatively low installation



1 costs but higher operating costs, are intended to be operated infrequently. They  
2 also provide resources that can be started in a relatively short time for emergency  
3 situations. In contrast, the large coal and nuclear steam generating plants have  
4 relatively high installation costs with lower operating costs, and are intended to  
5 operate in a manner to meet the constant level of demand on the system. Based on  
6 the load level that the Company is called on to serve at any given point in time, the  
7 Company selects the combination of facilities which will produce electricity in the  
8 most economical manner, giving due regard to reliability of service and safety. This  
9 total cost optimization approach provides for overall minimization of the total cost  
10 of providing service.

11 **Q. Please elaborate on the intended use of each type of facility the Company uses**  
12 **to generate electricity.**

13 **A.** As a general rule, peaking resources such as combustion turbines, are constructed  
14 with the intention of running them very infrequently, i.e., only during peak or  
15 emergency conditions. Combustion turbines are very effective in providing reserve  
16 capacity because they can be started quickly in response to a sharp increase in  
17 customer demand, without having to continuously operate the units. Intermediate  
18 facilities are intended to operate in a load following manner with periodic startups.  
19 They are best utilized to respond to the more predictable system load patterns  
20 because the intermediate facilities take some time to bring on-line from a cold shut  
21 down state. Additionally, these plants, located across the Company's service  
22 territory, contribute to overall system reliability. The Company's intermediate  
23 facilities are predominately our older coal-fired plants and gas-fired combined cycle

1 unit. They generally operate in a load following mode, being ramped up and  
2 ramped down to meet system needs. Baseload facilities are intended and designed  
3 to operate on a near continuous basis with the exception of outages for required  
4 maintenance, modifications, repairs, major overhauls, or for refueling in the case of  
5 nuclear plants. The Company's four nuclear units and five Person County coal units  
6 constitute the Company's baseload facilities.

7 **Q. How much electricity was generated by each type of Company generating unit**  
8 **in the 11 month period ending February 29, 2008?**

9 **A.** For the eleven-month period ending February 29, 2008, the Company generated  
10 58,924,664 megawatt hours of electricity. Nuclear plants generated 44.53%, fossil  
11 plants generated 50.21%, combined cycle and combustion turbine units generated  
12 4.75%, and hydroelectric units generated 0.51% of the total amount of electricity  
13 generated.

14 **Q. How does the Company ensure that it operates these types of generating**  
15 **facilities as economically as possible?**

16 **A.** The Company has a central Energy Control Center which monitors the electricity  
17 demands within our service area. The Energy Control Center regulates and  
18 dispatches available generating units in response to customer demand in a least cost  
19 manner. Sophisticated computer control systems match the changing load with  
20 available sources of power. Personnel at the Energy Control Center, in addition to  
21 being in contact with the Company's generating plants, are also in communication  
22 with other utilities bordering our service territory. In the event a plant is suddenly  
23 forced off-line, the interconnections with neighboring utilities help to ensure that

1 service to our customers will go uninterrupted. Additionally, the interconnections  
2 allow us access to the unloaded capacity of neighboring utilities so that our  
3 customers will be served by the lowest cost power available through inter-utility  
4 purchases.

5 **Q. How does the Company determine when it needs to purchase power?**

6 **A.** The Company is constantly reviewing the power markets for purchase  
7 opportunities. We buy when there is reliable power available that is less expensive  
8 than the marginal cost of all available resources to the Company. This review of  
9 the power markets is done on an hourly, daily, weekly, monthly basis. Also, with  
10 regard to long term resource planning, we always evaluate purchased power  
11 opportunities against self build options.

12 **Q. During the review period April 1, 2007 through February 29, 2008, did the**  
13 **Company prudently operate its generating system within the guidelines**  
14 **discussed in regard to the three types of facilities?**

15 **A.** Yes. Two different measures are utilized to evaluate the performance of generating  
16 facilities. They are equivalent availability factor and capacity factor. Equivalent  
17 availability factor refers to the percent of a given time a facility was available to  
18 operate at full power if needed. Capacity factor measures the generation a facility  
19 actually produces against the amount of generation that theoretically could be  
20 produced in a given time period, based on its maximum dependable capacity.  
21 Equivalent availability factor describes how well a facility was operated, even in  
22 cases where the unit was used in a load following application. Our combustion  
23 turbines averaged 93.43% equivalent availability and a 6.07% capacity factor for



1 the eleven-month period ending February 29, 2008. These performance indicators  
2 are consistent with the combustion turbine generation intended purpose. The  
3 generation was almost always available for use, but operated minimally. Our  
4 intermediate gas-fired combined cycle unit averaged 89.29% equivalent availability  
5 and a 36.67% capacity factor for the eleven-month period ending February  
6 29, 2008. Again, this level of operation is consistent with the facility's intended  
7 purpose, that being a load following position after our intermediate fossil plants.  
8 Our intermediate (or cycling) coal fired units, had an average equivalent availability  
9 factor of 89.72% and a capacity factor of 64.77% for the eleven-month period  
10 ending February 29, 2008. Again, these performance indicators are indicative of  
11 good performance and management for intermediate, load following facilities. Our  
12 fossil baseload units had an average equivalent availability of 90.07% and a  
13 capacity factor of 73.92% for the eleven-month period ending February 29, 2008.  
14 Thus, the fossil baseload units were also well managed and operated. For the  
15 eleven-month period ending February 29, 2008, the Company's nuclear generation  
16 system achieved an actual capacity factor of 93.64%. Excluding outage time  
17 associated with reasonable outages, such as refueling, the nuclear generation  
18 system's net capacity factor for this period rises to 101.7%. Therefore, pursuant to  
19 S.C. Code Ann. § 58-27-865(F), since the adjusted capacity factor exceeds 92.5%,  
20 the Company is presumed to have made every reasonable effort to minimize the  
21 cost associated with the operation of its nuclear generation.

22 **Q: How did the performance of the Company's nuclear system compare to the**  
23 **industry average?**



1   **A:**   As mentioned in the response to the previous question, during the period April  
2           1, 2007 through February 29, 2008, the Company's nuclear generation system  
3           achieved an actual capacity factor of 93.64%. In contrast, the NERC five-year  
4           average capacity factor for 2002-2006 for all commercial nuclear generation in  
5           North America was 87.90%. The Company's nuclear system incurred a 0.58%  
6           forced outage rate during the eleven-month period ending February 29, 2008  
7           compared to the industry average of 4.21%. These performance indicators reflect  
8           good nuclear performance and management for the review period.

9   **Q.   How did the Company's fossil units perform as compared to the industry?**

10   **A.**   Our entire fossil steam generation fleet operated well during the 11 months ending  
11           February 29, 2008, achieving an equivalent availability factor of 89.81% for this  
12           period. This performance indicator exceeds the most recently published NERC  
13           average equivalent availability for coal plants of 85.05%. The NERC average  
14           covers the period 2002-2006 and represents the performance of 905 coal-fired units.  
15           Equivalent availability is a more meaningful measure of performance for coal  
16           plants than capacity factor because the output of our fossil units varies significantly  
17           depending on the level of system load. For the eleven-month period ending  
18           February 29, 2008, our baseload fossil units, Mayo Unit 1, and Roxboro Units 1, 2,  
19           3, and 4, operated at equivalent availabilities of 97.95%, 89.74%, 87.10%, 93.15%,  
20           and 82.39% respectively. Roxboro 2 and Roxboro 4 have relatively lower  
21           equivalent availabilities due to major turbine outages and scrubber installations that  
22           occurred in the spring 2007 and fall 2007, for each unit respectively.

1 As I mentioned earlier, the baseload coal units achieved an average equivalent  
2 availability of 90.07%. These performance indicators compare well with the  
3 industry weighted average equivalent availability factor of 84.83% for 177  
4 similarly sized fossil units.

5 **Q. How did the Company's hydroelectric units perform during the review**  
6 **period?**

7 **A.** The usage of the hydro facilities on the Company's system is limited by the  
8 availability of water that can be released through the turbine generators. The  
9 Company's hydro plants have very limited ponding capacity for water storage. The  
10 Company operates the hydro plants to obtain the maximum generation from them;  
11 but because of the small water storage capacity available, the hydro units have been  
12 primarily utilized for peaking and regulating purposes. This operation maximizes  
13 the economic benefit of the units. The hydroelectric units had an equivalent  
14 availability of 95.21% and operated at a capacity factor of 16.36% for the eleven-  
15 month period ending February 29, 2008. The 5 year industry average for  
16 hydroelectric generation as published in NERC's most recent report reflects an  
17 average equivalent availability of 88.41% and an average capacity factor of  
18 42.00%. These performance indicators show that the Company managed the  
19 hydroelectric facilities well, keeping them almost always available for economic  
20 use when water was available. The low capacity factor for the Company's  
21 hydroelectric facilities reflects the exceptional drought conditions experienced  
22 across the Company's system during the review period. However, hydroelectric  
23 facility generation comprises only a small amount of the total energy generated for

1 the Company's system needs. For the 2005-2006, 2006-2007, and 2007-2008  
2 review periods, the Company's hydroelectric generation facilities generated 1.14%,  
3 1.01%, and 0.51% of the total energy generated by the Company's system.

4 **Q. Are you presenting any exhibits with your testimony?**

5 **A.** Yes. Roberts Exhibit No. 1 is a graphic representation of the Company's generation  
6 system operation for the eleven-month period ending February 29, 2008.

7 **Q. Did the Company prudently operate and dispatch its generation resources**  
8 **during the period April 1, 2007 through February 29, 2008 in order to**  
9 **minimize its fuel costs?**

10 **A.** Yes.

11 **Q. Does this conclude your testimony?**

12 **A.** Yes.

13

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**Comparison of Progress Energy Carolinas  
Installed Generating Capacity  
to Actual Generation Mix  
April 1, 2007 through February 29, 2008**

